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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/CSG/W.No.15/2021-22 Date : 22.12.2021

GRADATION FOR WMM

Client : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency : **Smt. C S Girija,** Contractor, Bangalore.
Name of Work : Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore
IS Code: :IS 2386 (Part 1):1963(RA 2011)
Date of Testing : 22.12.2021
Material Type : Wet Mix Macadam

Oven Dry.Wt, grar 10000

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Requirement as per MORTH 5th edition table no 400.13
53	0	0	0	100	100
45	196	196	2.0	98.0	95-100
22.4	2351	2547	25.5	74.5	60-80
11.2	2067	4614	46.1	53.9	40-60
4.75	1757	6371	63.7	36.3	25-40
2.36	1238	7609	76.1	23.9	15-30
0.600	509	8118	81.2	18.8	8-22
0.075	1541	9659	96.6	3.4	0-5

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Corporate Off.: No. 133, Bhuvaneshwarinagar, Doddabasti Main Road, Bangalore-560 056.
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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/CSG/W.No.15/2021-22 Date : 22.12.2021

GRADATION FOR WMM

Client : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency : **Smt. C S Girija,** Contractor, Bangalore.
Name of Work : Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore
IS Code: :IS 2386 (Part 1):1963(RA 2011)
Date of Testing : 22.12.2021
Material Type : Wet Mix Macadam

Oven Dry.Wt, grar 10000

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Requirement as per MORTH 5th edition table no 400.13
53	0	0	0	100	100
45	208	208	2.1	97.9	95-100
22.4	2234	2442	24.4	75.6	60-80
11.2	2189	4631	46.3	53.7	40-60
4.75	1655	6286	62.9	37.1	25-40
2.36	1143	7429	74.3	25.7	15-30
0.600	512	7941	79.4	20.6	8-22
0.075	1664	9605	96.1	4.0	0-5

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/CSG/W.No.15/2021-22 **Date:** 22.12.2021

Aggregate Impact Value

Client	**: Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	**: Smt. C S Girija,** Contractor, Bangalore.
Name of the Work	: Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore
IS Code:	IS 2386 (Part 4):1963(RA 2011)
Type of Mix	Wet Mix macadam
Date of Testing	22.12.2021

Sl No.	Details	Test No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	385	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	89	87	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	296	298	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	23.12	22.60	**22.86**

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%(As per MORTH Specication table 400.12)

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Job No.: CQCE/BBMP/CSG/W.No.15/2021-22 22.12.2021

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	: **Smt. C S Girija,** Contractor, Bangalore.
Name of Work	: Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore
BIS code:	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	22.12.2021

Sl no	Test	1	2	Requirements as per MORTH 5th edition table no 400.12
1	Flakiness Index %	12.2	11.7	Combined Flakiness & Elongation index Max 35%
2	Elongation Index %	10.6	10.4	
	Combined Flakiness & Elongation index	22.80	22.1	

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/CSG/W.No.15/2021-22 Date :24.12.2021

ATTERBERG LIMITS TEST FOR WMM

Client : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency : **Smt. C S Girija,** Contractor, Bangalore.
Name of Work : Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore
IS Code: IS 2720(Part 5):1985
Date of Testing : 22.12.2021 to 24.12.2021
Material Type : Wet Mix Macadam

Sl. No.	Particulars	Test Results	Requirement as per MORTH 5th edition Cl.406.2.1.2
1	Liquid Limit	22.00	-
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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Job No.: CQCE/BBMP/CSG/W.No.15/2021-22 Date :24.12.2021

ATTERBERG LIMITS TEST FOR WMM

Client : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.

Agency : **Smt. C S Girija,** Contractor, Bangalore.

Name of Work : Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore

IS Code: IS 2720(Part 5):1985

Date of Testing : 22.12.2021 to 24.12.2021

Material Type : Wet Mix Macadam

Sl. No.	Particulars	Test Results	Requirement as per MORTH 5th edition Cl.406.2.1.2
1	Liquid Limit	19.55	-
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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Job No: CQCE/BBMP/CSG/W.No.15/2021-22 Date: 22.12.2021

TEST REPORT ON PAVING BITUMEN

Client :	**: Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency:	**: Smt. C S Girija,** Contractor, Bangalore.
Name of work:	: Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore
BIS Code:	IS 73:2013,IS 1203:1978, IS 1208:1978, IS 1205:1978, IS1448(P-69):1969
Date of Testing:	**22.12.2021**
Type of Mix:	**Dense Graded Bituminous Macadam , VG 30**
Source of Location:	**Hot Mix Plant**

The results of the tests conducted on the bitumen sample using for Dense Graded Bituminous Macadam

Sl.No	Description	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 0C, 100gms, 5sec, 1/10 mm	51	Min 45
2	Softening point, 0C	63	Min 47
3	Ductility at 250C, cm	99	Min40
4	Flash Point, 0C	271	Min 220

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

JobNo: CQCE/BBMP/CSG/W.No.15/2021-22 Dated: 22.12.2021

TEST RESULTS OF AGGREGATE IMPACT VALUE

Client : : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency: : **Smt. C S Girija,** Contractor, Bangalore.
Name of work: : Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore
Source / Location Hot Mix Plant, Bangalore
BIS Code: IS 2386 Part (4):1963
Type of Mix: Dense Graded Bituminous Macadam
Date of test: 22.12.2021

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W1 g	400	400	
2	Weight of agregate passing 2.36 mm sieve after the test = W2 g	85	82	
3	Weight of aggregate retained 2.36 mm sieve after the test = W3 g	315	318	
5	Aggregate Impact value = percent fines 100* (W2/W1) percent	21.25	20.50	**20.88**

Comments:
→ Maximum allowable Aggregate Impact value for Dense Graded Bituminous Macadam is 27% (Table 500-8 of MORTH specification)

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JobNo: CQCE/BBMP/CSG/W.No.15/2021-22 Date 22.12.2021

TEST RESULTS OF AGGREGATE SHAPE TEST
(Flakiness & Elongation)

Client : : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.

Agency: : **Smt. C S Girija,** Contractor, Bangalore.

Name of work: : Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore

BIS Code: IS 2386 Part (1):1963

Date of Test: 22.12.2021

Type of Mix: Dense Graded Bituminous Macadam

Sl.No.	Flakiness Index Value(%)	Elongation Index Value(%)	Total(Combined Flakiness and Elongation)(%)	Requirements
1	10.30	11.70	22.00	Maximum allowable Combined Flakiness and Elongation Indices for Dense Graded Bituminous Macadam is 35% as per Table 500.8 MORTH Specification.
2	11.50	10.90	22.40	

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Job No.: CQCE/BBMP/CSG/W.No.15/2021-22 Date: 24.12.2021

Specific Gravity And Water Absorption Test

Client	**: Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	**: Smt. C S Girija,** Contractor, Bangalore.
Name of the Work	: Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore
BIS Code	IS 2386(Part 3):1963
Type of Mix	Dense Graded Bituminous Macadam
Date of Testing	22.12.2021 to 24.12.2021

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2020	2022	2023	
2	Weight of basket suspended in water	W_2 g	754	754	754	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1266	1268	1269	
4	Weight of saturated surface dry aggregate in air	W_3 g	2017	2016	2015	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	751	748	746	
6	Weight of oven dried aggregate	W_4 g	2007	2007	2005	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.672	2.683	2.688	2.681
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.709	2.716	2.724	2.716
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.50%	0.45%	0.50%	0.48%

Comments:

→ Maximum allowable Aggregate Water absorption value for Dense Graded Bituminous Macadam is 2.0%(As per MORTH table 500.8)

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Job No.: CQCE/BBMP/CSG/W.No.15/2021-22 Date: 22.12.2021

Aggregate Gradation Test

Client	**: Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	**: Smt. C S Girija,** Contractor, Bangalore.
Name of the Work	: Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore
BIS Code	IS 2386(Part 1):1963(RA 2011)
Sample I / D	Hot mix Plant, Bangalore.
Type of Mix	Dense Graded Bituminous Macadam
Date of Testing	22.12.2021

Total Weight of Sample: **10000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.10	Remarks
37.50	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
26.50	625	6.3	6.25	93.75	90 - 100	
19.00	1034	10.3	16.59	83.41	71 - 95	
13.20	1198	12.0	28.57	71.43	56 - 80	
4.75	2265	22.7	51.22	48.78	38 - 54	
2.36	1103	11.0	62.25	37.75	28 - 42	
0.300	1877	18.8	81.02	18.98	7 - 21	
0.075	1348	13.5	94.50	5.50	2 - 8	

Total Weight of Sample: **10000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.10	Remarks
37.5	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
26.5	647	6.5	6.47	93.53	90 - 100	
19	1193	11.9	18.40	81.60	71 - 95	
13.2	1214	12.1	30.54	69.46	56 - 80	
4.75	2358	23.6	54.12	45.88	38 - 54	
2.360	1207	12.1	66.19	33.81	28 - 42	
0.300	1793	17.9	84.12	15.88	7 - 21	
0.075	1002	10.0	94.14	5.86	2 - 8	

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ಟಿ. ದಾಸರಹಳ್ಳಿ ಉಪ-ವಿಭಾಗ
ಬಾಗಲಗುಂಟೆ, ಬಿಬಿಎಂಪಿ
ಬೆಂಗಳೂರು

Authorised Signatory

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ISO 9001:2015 Certified & NABL Accredited Laboratory as per ISO/IEC - 17025-2017
Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/CSG/W.No.15/2021-22 Date: 25.12.2021

BITUMEN CONTENT AND GRADATION DETERMINATION OF DENSE GRADED BITUMINOUS MACADAM MIX
AASHTO T 164 & AASHTO T 30

Client	: **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	: **Smt. C S Girija,** Contractor, Bangalore.
Name of the Work	: Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore
Date of Testing	25.12.2021

BITUMEN CONTENT DETERMINATION

Description	Test 1	Test 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	477	476.5
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	23.00	23.50
7. Bitumen content in %	4.60	4.70
8. Average	4.65	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	31.8	31.8	6.7	93.3	90 - 100
19	70.6	102.4	21.5	78.5	71 - 95
13.2	63.1	165.5	34.7	65.3	56 - 80
4.75	83.4	248.9	52.2	47.8	38 - 54
2.360	78.7	327.6	68.7	31.3	28 - 42
0.300	94.1	421.7	88.4	11.6	7 - 21
0.075	21.2	442.9	92.9	7.1	2 - 8

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	33.8	33.8	7.1	92.9	90 - 100
19	71.9	105.7	22.2	77.8	71 - 95
13.2	65.6	171.3	35.9	64.1	56 - 80
4.75	88.20	259.5	54.5	45.5	38 - 54
2.360	46.9	306.4	64.3	35.7	28 - 42
0.300	90.2	396.6	83.2	16.8	7 - 21
0.075	43.1	439.7	92.3	7.7	2 - 8

Note:
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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/CSG/W.No.15/2021-22 Date: 25.12.2021

BITUMEN CONTENT AND GRADATION DETERMINATION OF DENSE GRADED BITUMINOUS MACADAM MIX AASHTO T 164 & AASHTO T 30

Client	: **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	: **Smt. C S Girija,** Contractor, Bangalore.
Name of the Work	: Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore
Date of Testing	25.12.2021

BITUMEN CONTENT DETERMINATION

Description	Test 1	Test 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	476.8	477.2
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	23.20	22.80
7. Bitumen content in %	4.64	4.56
8. Average	4.60	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	32.3	32.3	6.8	93.2	90 - 100
19	71.4	103.7	21.7	78.3	71 - 95
13.2	64.8	168.5	35.3	64.7	56 - 80
4.75	82.1	250.6	52.6	47.4	38 - 54
2.360	76.9	327.5	68.7	31.3	28 - 42
0.300	95.1	422.6	88.6	11.4	7 - 21
0.075	22.3	444.9	93.3	6.7	2 - 8

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	35.4	35.4	7.4	92.6	90 - 100
19	72.8	108.2	22.7	77.3	71 - 95
13.2	66.8	175	36.7	63.3	56 - 80
4.75	85.10	260.1	54.5	45.5	38 - 54
2.360	45.5	305.6	64.0	36.0	28 - 42
0.300	83	388.6	81.4	18.6	7 - 21
0.075	62.2	450.8	94.5	5.5	2 - 8

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/CSG/W.No.15/2021-22 Date: 25.12.2021

TEST REPORT ON STABILITY OF MIX

Client	:	**: Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	:	**: Smt. C S Girija,** Contractor, Bangalore.
Name of the Work	:	: Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore
Type of Mix	:	Dense Graded Bituminous Macadam
Date of Testing	:	25.12.2021

The results of the tests conducted on the Dense Graded Bituminous Macadam mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.63	10.98	9 Kn (min)
2	Marshal flow, mm	3.27	3.75	2 – 4
3	Percent air voids in Mineral Aggregate	14.65	13.58	13 – 15
4	Voids in Compacted Mix	3.31	3.94	3 – 6
5	Percent Voids filled with Bitumen	67.02	70.11	65 - 75
6	Density, g/cc	2.26	2.27	--

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/CSG/W.No.15/2021-22 Date: 23.12.2021

TEST REPORT

Client	:	**: Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	:	**: Smt. C S Girija,** Contractor, Bangalore.
Name of the work	:	: Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore
IS Code	:	IS 73:2013, IS 1203:1978(RA 2008), IS 1205:1978(RA 2009), IS 1208:1978(RA 2009), IS 1209:1978(RA 2009)
Source of location	:	Hot mix Plant, Bangalore, VG 30
Date of testing	:	23.12.2021

The results of the tests conducted on the bitumen sample using for Bituminous Concrete

Sl. No	Description	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	53	Min 45
2	Softening point, ^{0}C	52	Min. 47
3	Ductility at 27^{0}C, cm	100 >	Min. 40
4	Flash Point, ^{0}C	286	Min. 220

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/CSG/W.No.15/2021-22 23.12.2021

Aggregate Impact Value

Client	**: Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	**: Smt. C S Girija,** Contractor, Bangalore.
Name of the Work	: Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore
BIS Code	:IS 2386(Part 4):1963
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	23.12.2021

Sl No.	Details	Test No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	383	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	86	88	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	295	
4	Aggregate Impact value = percent fines 100* (W_2/W_1) percent	22.34	22.98	**22.66**

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%(MORTH table no.500.16)

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Job No.: CQCE/BBMP/CSG/W.No.15/2021-22

23.12.2021

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**: Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	**: Smt. C S Girija,** Contractor, Bangalore.
Name of Work	: Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Bituminous Concrete
Date of Testing	23.12.2021

Sl no	Test	1	2	3	Requirements as per MORTH 5th edition table no 500.16
1	Flakiness Index	11.5	9.8	10.2	Combined Flakiness & Elongation index Max 35%
2	Elongation Index	10.6	9.9	10.6	
	Combined Flakiness & Elongation index	22.10	19.70	20.80	

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Job No.: CQCE/BBMP/CSG/W.No.15/2021-22

25.12.2021

Specific Gravity And Water Absorption Test

Client	**: Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	**: Smt. C S Girija,** Contractor, Bangalore.
Name of the Work	: Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore
BIS Code	:IS 2386(Part 3):1963
Type of Mix	Bituminous Concrete
Date of Testing	23.12.2021 to 25.12.2021

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2021	2020	2024	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1266	1265	1269	
4	Weight of saturated surface dry aggregate in air	W_3 g	2015	2015	2019	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	749	750	750	
6	Weight of oven dried aggregate	W_4 g	2005	2006	2009	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.677	2.675	2.679	2.677
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.713	2.707	2.715	2.712
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.50%	0.45%	0.50%	0.48%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%(MORTH table 500.16)

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Job No.: CQCE/BBMP/CSG/W.No.15/2021-22 22.12.2021

Aggregate Gradation Test

IS : 2386 Part I

Client	: **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	: **Smt. C S Girija,** Contractor, Bangalore.
Name of the Work	: Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore
BIS Code	:IS 2386(Part 1):1963
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	22.12.2021

Total Weight of Sample: **5000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	415	8.30	8.30	91.70	90 - 100	
9.5	485	9.70	18.00	82.00	70 - 88	
4.75	635	12.70	30.70	69.30	53 - 71	
2.36	678	13.56	44.26	55.74	42 - 58	
1.18	524	10.48	54.74	45.26	34 - 48	
0.600	556	11.12	65.86	34.14	26 - 38	
0.300	485	9.70	75.56	24.44	18 - 28	
0.150	325	6.50	82.06	17.94	12 - 20	
0.075	485	9.70	91.76	8.24	4 - 10	

Total Weight of Sample: **5000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	402	8.04	8.04	91.96	90 - 100	
9.5	545	10.90	18.94	81.06	70 - 88	
4.75	684	13.68	32.62	67.38	53 - 71	
2.36	539	10.78	43.40	56.60	42 - 58	
1.18	584	11.68	55.08	44.92	34 - 48	
0.600	545	10.90	65.98	34.02	26 - 38	
0.300	684	13.68	79.66	20.34	18 - 28	
0.150	256	5.12	84.78	15.22	12 - 20	
0.075	336	6.72	91.50	8.50	4 - 10	

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Job No.: CQCE/BBMP/CSG/W.No.15/2021-22 27.12.2021

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

AASHTO T 164 & AASHTO T 30

CLIENT	: Executive Engineer, Dasarahalli Division, BBMP, Bangalore.
AGENCY	: Smt. C S Girija, Contractor, Bangalore.
NAME OF THE WORK	: Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore
SAMPLE ID	:Hot Mix Plant, Bangalore
DATE OF TESTING	27.12.2021

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	473	472.5
3. Weight of Asphalt and Mineral matter Extracted, g	27	27.5
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	27	27.5
7. Bitumen content in %	5.40	5.50
8. Average	5.45	

GRADATION AFTER EXTRACTION

SIEVE SIZE mm	Test 1 Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.17
19	0	0	0	100	100
13.2	12.2	12.2	2.6	97.4	90 - 100
9.5	65.3	77.5	16.4	83.6	70 - 88
4.75	98	175.5	37.1	62.9	53 - 71
2.36	46	221.5	46.8	53.2	42 - 58
1.18	42.3	263.8	55.8	44.2	34 - 48
0.600	51.1	314.9	66.6	33.4	26 - 38
0.300	43.9	358.8	75.9	24.1	18 - 28
0.150	32.1	390.9	82.6	17.4	12 - 20
0.075	49.2	440.1	93.0	7.0	4 - 10

SIEVE SIZE mm	Test 2 Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.17
19	0	0	0	100	100
13.2	12.2	12.2	2.6	97.4	90 - 100
9.5	65.3	77.5	16.4	83.6	70 - 88
4.75	98	175.5	37.1	62.9	53 - 71
2.36	46	221.5	46.9	53.1	42 - 58
1.18	42.3	263.8	55.8	44.2	34 - 48
0.600	51.1	314.9	66.6	33.4	26 - 38
0.300	43.9	358.8	75.9	24.1	18 - 28
0.150	32.1	390.9	82.7	17.3	12 - 20
0.075	49.2	440.1	93.1	6.9	4 - 10

For CIVIL QUALITY CONSULTANTS & ENGINEERS

Authorised Signatory

Note:

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ISO 9001:2015 Certified & NABL Accredited Laboratory as per ISO/IEC - 17025-2017

Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/CSG/W.No.15/2021-22 27.12.2021

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

AASHTO T 164 & AASHTO T 30

CLIENT	: Executive Engineer, Dasarahalli Division, BBMP, Bangalore.
AGENCY	: Smt. C S Girija, Contractor, Bangalore.
NAME OF THE WORK	: Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore
SAMPLE ID	:Hot Mix Plant, Bangalore
DATE OF TESTING	27.12.2021

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	472.8	472.3
3. Weight of Asphalt and Mineral matter Extracted, g	27.2	27.7
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	27.2	27.7
7. Bitumen content in %	5.44	5.54
8. Average	5.49	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.17
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	11.6	11.6	2.5	97.5	90 - 100
9.5	61.8	73.4	15.5	84.5	70 - 88
4.75	99.7	173.1	36.6	63.4	53 - 71
2.36	44.3	217.4	46.0	54.0	42 - 58
1.18	41.2	258.6	54.7	45.3	34 - 48
0.600	50.8	309.4	65.4	34.6	26 - 38
0.300	45.6	355	75.1	24.9	18 - 28
0.150	31.7	386.7	81.8	18.2	12 - 20
0.075	46.5	433.2	91.6	8.4	4 - 10

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.17
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	12.6	12.6	2.7	97.3	90 - 100
9.5	64.7	77.3	16.4	83.6	70 - 88
4.75	96.3	173.6	36.8	63.2	53 - 71
2.36	45.4	219	46.4	53.6	42 - 58
1.18	41.2	260.2	55.1	44.9	34 - 48
0.600	50.5	310.7	65.8	34.2	26 - 38
0.300	42.6	353.3	74.8	25.2	18 - 28
0.150	33.7	387	81.9	18.1	12 - 20
0.075	48.5	435.5	92.2	7.8	4 - 10

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Testing of Construction Material - Mechanical, Soil, Bitumen, Non Destructive Testing Services, Project Management Consultants, Third Party Quality Assurance, DPR.

Job No.: CQCE/BBMP/CSG/W.No.15/2021-22 Date: 27.12.2021

TEST REPORT ON STABILITY OF MIX

Client	:	**: Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
Agency	:	**: Smt. C S Girija,** Contractor, Bangalore.
Name of the Work	:	: Improvements and Re-Asphalting 3rd main road Kempegowda Nagara and surrounding roads in Dasarahalli ward no.15, BBMP, Bangalore
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	27.12.2021

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.12	10.24	9 Kn (min)
2	Marshal flow, mm	3.35	2.98	2 – 4
3	Percent air voids in Mineral Aggregate	13.84	14.65	13 – 15
4	Voids in Compacted Mix	3.62	4.65	3 – 6
5	Percent Voids filled with Bitumen	66.16	69.22	65 - 75
6	Density, g/cc	2.25	2.26	--

Note:

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Authorised Signatory

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ಟಿ. ದಾಸರಹಳ್ಳಿ ಉಪ-ವಿಭಾಗ
ಬಾಗಲಗುಂಟೆ, ಬಿಬಿಎಂಪಿ
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